Case Study	**Grand Chute Menasha West Sewerage Commission Ultraviolet Disinfection System**
Standard Industrial Classification (SIC)	Sewerage System/4952
Type of Waste	Residual chlorine in wastewater effluent
Strategy	Process/equipment modification
Company Background	The Grand Chute Menasha West Sewerage Commission (GCMWSC) was established in 1981. The wastewater treatment facility was built in 1983 and provides sewage treatment services for the towns of Grand Chute, Menasha, and Greenville. The facility operates with nine full-time employees.
Original Process	Seasonal fecal coliform limits on the wastewater effluent require disinfection of the wastewater. Disinfection was accomplished by adding chlorine prior to discharge. It was anticipated that future permits would also require dechlorination of the wastewater prior to discharge. Expansion of existing facilities would have been necessary along with additional chemical feed to accomplish dechlorination.
Motivation	The main motivation for selecting a new disinfection process was to enhance public safety by eliminating the source of potential accidental releases of chlorine gas. GCMWSC needed to anticipate future permit requirements and was motivated to keep chlorine out of the Fox River to limit environmental liability.
Pollution Prevention Process	The wastewater effluent is directed into channels that contain ultraviolet (UV) lamps. These lamps emit UV wavelengths that disinfect by destroying fecal coliform bacteria and other harmful organisms. This process treats a maximum design flow of 16.4 million gallons/day and effectively meets or exceeds permit limits without the addition of any chemicals to the secondary effluent.
Stage of Development	The UV disinfection system has been in use since July of 1993.
Level of Commercialization	UV disinfection of wastewater effluent was developed for tertiary effluents but not secondary effluents. Pilot testing was done to demonstrate feasibility to treat a secondary effluent and to address maintenance concerns for this facility.
Obstacles	Information to operate a UV disinfection system was not readily available. Employees engaged a "trial-and-error" approach to run the process effectively.
Material/Energy Balance	

	Description	**Expanded Chlorine Disinfection**	**UV Disinfection**

Feedstock	chlorine for disinfection	313 lbs/day	0
Energy	electricity	1,283 KWH/yr.	69,120 KWH/yr.
Waste/Disposal	SO_2 for dechlorination of effluent	196 lbs/day	0

Economics

Capital Costs	**Description**	**Cost/Benefit**
Equipment cost	1) UV disinfection system 2) chlorine/dechlorination	$900,000($750,000)
Space needs (saving)	additional chlorine contact tank needed	($25,000)
	Total	$225,000

The costs for upgrading the disinfection system were compared to evaluate a net capital cost.

Operating Costs	**Description**	**Cost Old Process**	**Cost New Process**	**Cost/Savings**
Raw Materials/supplies	1) chemicals 2) lamps	$50,000 0	$1,000 $5,000	$44,000
Labor (process operation; time spent ordering/receiving supplies)		$20,000	$20,000	0
Maintenance (both labor and materials)		$5,000	$5,000	0
On-going safety and equipment training		$5,000	$1,000	$4,000
Annual Permits		$6,000	0	$6,000
Paperwork		$3,000	$500	$2,500
Utilities	electricity	$1,000	$10,000	($9,000)
			Total Cost Savings/Year	$47,500

	Payback Period In comparing the cost of upgrading the original chlorine disinfection system versus selecting the new ultraviolet disinfection system, GCMWSC can expect to recover the cost difference of this process in a little under 5 years.
Benefits	Benefits include: decreased environmental and financial liability, elimination of chemical use, ease of meeting permit requirements, elimination of reporting requirements, and elimination of the need for an evacuation plan.
Technology Transfer	The technologies applied at GCMWSC are currently available and can be applied elsewhere.
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Pollution Prevention Resources	Department of Natural Resources Northeast Region Carol Schmidt, 414/492-5871 **Free, On-site Technical Assistance** University of Wisconsin Extension Solid and Hazardous Waste Education Center Milwaukee area: 414/475-2845 Remainder of state: 608/262-0385 **Pollution Prevention Information Clearinghouse** Wisconsin Department of Natural Resources Cooperative Environmental Assistance 608/267-9700 or e-mail: cea@dnr.state.wi.us

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